

REMARKS

The Applicants sincerely appreciate the thorough examination of the present application as evidenced by the Office Action of February 4, 2003. In response, the Applicants have rewritten Claims 3-5, 10-11, 13, 16-18, 23-24, 26, 29-31, 36-37, and 39 in independent form; amended Claims 2, 9, and 12 to depend from Claim 5; amended Claim 8 to depend from Claim 11; amended Claims 22 and 25 to depend from Claim 18; amended Claim 12 to depend from Claim 24; amended Claims 35 and 38 to depend from Claim 31; amended Claim 34 to depend from Claim 37; and canceled Claims 1, 14-15, 27-28, and 40. The Applicants have also amended the independent claims to overcome all rejections under 35 U.S.C. Sec. 112.

The Applicants will show in the following remarks that all pending claims are patentable over the cited art. The Applicants also note that no prior art rejections have been applied to Claims 11, 13, 24, 26, and 37-39. As no rejections have been applied to these claims and all rejections under 35 U.S.C. Sec. 112 have been overcome, the Applicants submit that these claims are patentable over the cited art. For at least these reasons, the Applicants respectfully submit that all claims are in condition for allowance, and a Notice of Allowance is, thus, respectfully requested in due course.

Consideration Of New IDS Is Respectfully Requested

A new Information Disclosure Statement (IDS) is being submitted concurrently herewith. Consideration of the references cited in the Information Disclosure Statement is respectfully requested.

All Rejections Under 35 U.S.C. Sec. 112 Have Been Overcome

All Claims have been rejected under 35 U.S.C. Sec. 112, first paragraph, with the Office Action taking the position that "the specification does not reasonably provide enablement for the reflected light alone forming the interferometric image or the use of a hologram (or interferometric article) as the reflected image." All Claims have been further rejected under 35 U.S.C. Sec. 112, second paragraph, with the

Office Action taking the position that the claims should clearly indicate that the interferometric image is at the image place ... and that the reflective surface is not "holographic", and that "It should be made clear if the process ... requires prior knowledge/design of the interference pattern projected...."

The Applicants have amended all independent claims to clarify that a portion of the coherent radiation is projected to the layer without reflecting off the reflector surface. In addition, the independent claims have been amended to clarify that the holographic projection of the desired image is projected onto the layer to thereby pattern the layer with the desired image. Accordingly, the Applicants respectfully submit that all rejections under 35 U.S.C. Sec. 112 have been overcome.

Claims 11, 13, 24, 26, and 37-38 Are Patentable As No Prior Art Rejections Have Been Applied To These Claims

Claims 11, 13, 24, 26, and 37-38 are patentable as all rejections under 35 U.S.C. Sec. 112 have been overcome and as no prior art rejections have been applied to these claims. Moreover, these claims have been rewritten in independent form. Accordingly, the Applicants respectfully request allowance of Claims 11, 13, 24, 26, and 37-38.

Claims 10, 23, and 36 Are Patentable Over Howells

Claims 10, 23, and 36 have been rejected under 35 U.S.C. Sec. 102(b) as being anticipated by U.S. Patent No. 5,455,850 to Howells et al. Claims 10, 23, and 36, however, are patentable for at least the reasons discussed below.

Claim 10, for example, recites a method for patterning a layer on a substrate with a desired image. The method includes:

projecting coherent radiation toward a reflector surface so that the coherent radiation is reflected off the reflector surface to provide a holographic projection of the desired image wherein the reflector surface includes information that corresponds to an inverse of the holographic projection of the desired image;

projecting a portion of the coherent radiation to the layer without reflecting off the reflector surface; and

maintaining the substrate including the layer in the path of the reflected radiation and in the path of the portion of the coherent radiation projected without reflecting off the reflector surface so that the holographic projection of the desired image is projected onto the layer to thereby pattern the layer with the desired image;

wherein the step of projecting the coherent radiation comprises projecting the coherent radiation along divergent paths.

The Applicants respectfully submit that Howells fails to teach or suggest the recitations of Claim 10. In particular, Howells fails to teach or suggest projecting coherent radiation along divergent paths. As shown in Figure 11 of Howells, the light beam 33 of Howells is projected toward the optical substrate 35 along parallel paths. Accordingly, the Applicants respectfully submit that Claim 10 is patentable over Howells. The Applicants further submit that Claims 23 and 36 are patentable for reasons similar to those discussed above with regard to Claim 10.

Claim 10 Is Patentable Over Atkinson

Claim 10 has been rejected under 35 U.S.C. Sec. 102(b) as being anticipated by U.K. Publication No. GB 2 221 353 A ("Atkinson"). The Applicants respectfully submit, however, that Claim 10 is patentable over Atkinson for at least the reasons discussed below.

As discussed above, Claim 10 includes the recitation of "projecting the coherent radiation along divergent paths." Atkinson fails to teach or suggest projecting coherent radiation along divergent paths. In particular, Figures 1 and 2 of Atkinson show parallel light paths. Accordingly, the Applicants respectfully submit that Atkinson fails to teach or suggest the recitations of Claim 10 and that Claim 10 is thus patentable over Atkinson.

Claim 10 Is Patentable Over Mathisen

Claim 10 has been rejected under 35 U.S.C. Sec. 102(b) as being anticipated by U.S. Patent No. 3,582,176 to Mathisen ("Mathisen"). Claim 10, however, is patentable over Mathisen for at least the reasons discussed below. Claim 10 recites

a method for patterning a layer on a substrate with a desired image as discussed above.

The Office Action refers to the recording of a hologram with respect to Figure 4 of Mathisen. Figure 4 of Mathisen illustrates a system for constructing a single hologram representing every accessible surface of a three dimensional object. More particularly:

The object beam 22 is formed from collimated beam 45 by lenses 23 and 24 and is directed onto core 31 by beam splitter 25 and mirror 30. The light reflected by core 31 passes through beam splitter 25 and falls on film 21.

Mathisen, col. 3, lines 31-34. Accordingly, Figure 4 of Mathisen relates to recording a hologram on film 21 by reflecting a beam 22 off an object (core 31) as opposed to reflecting radiation off a reflector surface to project a holographic projection onto a layer for patterning of the layer. Moreover, Mathisen discusses a collimated beam as opposed to projecting coherent radiation along divergent paths. In addition, Mathisen fails to teach or suggest projecting radiation toward a reflector and to a layer without reflecting.

For at least the reasons discussed above, the Applicants submit that Mathisen fails to disclose or suggest the recitations of Claim 10 and that Claim 10 is thus patentable over Mathisen.

Claims 5-7, 10, 18-20, 23, 31-33, and 36 Are Patentable Over Spence

Claims 5-7, 10, 18-20, 23, 31-33, and 36 have been rejected under 35 U.S.C. Sec. 102(b) as being anticipated by, or in the alternative under 35 U.S.C. Sec. 103(a) as obvious over Spence et al. "Low Energy Point Reflection Electron Microscope" (hereinafter "Spence"). These claims are patentable over Spence for at least the reasons discussed below.

Claim 5, for example, recites a method for patterning a layer on a substrate with a desired image. The method of Claim 5 includes:

projecting coherent radiation toward a reflector surface so that the coherent radiation is reflected off the reflector surface to provide a

holographic projection of the desired image wherein the reflector surface includes information that corresponds to an inverse of the holographic projection of the desired image;

projecting a portion of the coherent radiation to the layer without reflecting off the reflector surface; and

maintaining the substrate including the layer in the path of the reflected radiation and in the path of the portion of the coherent radiation projected without reflecting off the reflector surface so that the holographic projection of the desired image is projected onto the layer to thereby pattern the layer with the desired image;

wherein the step of projecting coherent radiation comprises projecting a coherent beam of electrons.

In contrast the method of patterning of Claim 5, Spence discusses a "Point Reflection Electron Microscope". Spence, Title. Moreover, the Office Action does not appear to discuss portions of Spence that relate to patterning. In particular, the Office Action states that:

Spence et al. ... describes the use of a field emitter tip placed adjacent to a stepped surface with respect to Figure 7 and describes the resulting Fresnel diffraction image emerging from this. The measurements are done using microchannel plates (MCP) as shown in Figures 1 and 3.

It is not clear, that the measurement of the step shown in figure 7 was made using the microchannel plate detector. If it was, then the claims rejected under this heading are anticipated or alternatively, given the suggestion to do so in figure 7, it would have been obvious to use the experimental set-up shown in figure 3 to make the measurement using the microchannel plate detector.

Office Action, page 5. (Underline added.)

Accepting the characterization of Spence provided in the Office Action, for the sake of argument, Spence discusses "measurement" as opposed to patterning. Moreover, making measurement using a microchannel plate detector does not disclose or suggest patterning a layer with a desired image. Spence also fails to teach or suggest projecting a portion of the coherent radiation to a layer without reflecting off a reflector surface.

Accordingly, the Applicants respectfully submit that Spence fails to disclose or suggest the recitations of Claim 5, and Claim 5 is thus patentable over Spence.

Independent Claims 10, 18, 23, 31, and 36 are also patentable for reasons similar to

those discussed above. In addition, Dependent Claims 6-7, 19-20, and 32-33 are patentable at least as per the patentability of Claims 5, 18, and 31 from which they depend.

**Claims 5-7, 10, 18-20, 23, 31-33, and 36
Are Patentable Over The Combination Of Joy And Spence**

Claims 5-7, 10, 18-20, 23, 31-33, and 36 have been rejected under 35 U.S.C. Sec. 103(a) as being unpatentable over Joy et al. "Advanced SEM Imaging" (hereinafter "Joy") in view of Spence. These Claims are patentable over the combination of Joy and Spence for at least the reasons discussed below.

Claim 5, for example, recites a method for patterning a layer on a substrate with a desired image. The method of Claim 5 includes:

projecting coherent radiation toward a reflector surface so that the coherent radiation is reflected off the reflector surface to provide a holographic projection of the desired image wherein the reflector surface includes information that corresponds to an inverse of the holographic projection of the desired image;

projecting a portion of the coherent radiation to the layer without reflecting off the reflector surface; and

maintaining the substrate including the layer in the path of the reflected radiation and in the path of the portion of the coherent radiation projected without reflecting off the reflector surface so that the holographic projection of the desired image is projected onto the layer to thereby pattern the layer with the desired image;

wherein the step of projecting coherent radiation comprises projecting a coherent beam of electrons.

In contrast to the patterning method of Claim 5, both Joy and Spence relate to microscopes as evidenced for example by the titles: "Low Energy Point Reflection Electron Microscopy", and "Advanced SEM Imaging" (where SEM is an acronym for Scanning Electron Microscope). Accepting the characterization of the combination of Joy and Spence provided in the Office Action, for the sake of argument, capturing an image and/or measuring diffraction patterns fails to disclose or suggest patterning as recited in Claim 5. In particular, the Office Action states that:

It would have been obvious ... to modify Joy ... using microchannel plate detection means such as that taught by Spence ... with a reasonable expectation of capturing/resolving the desired diffraction image based upon the similarity of layout for the electron emitter tip and the scattering/reflection surface and the disclosure of measuring diffraction patterns in Spence....

Office Action, page 6. (Underline added.) Even accepting this characterization for the sake of argument, measuring diffraction patterns fails to teach or suggest patterning as recited in Claim 1.

For at least the reasons discussed above, the Applicants respectfully submit that Claim 5 is patentable over the combination of Joy and Spence. The Applicants further submit that Independent Claims 10, 18, 23, 31, and 36 are patentable over Joy and Spence for reasons similar to those discussed above with regard to Claim 5. In addition, Dependent Claims 6-7, 19-20, and 32-33 are patentable over Joy and Spence at least as per the patentability of Claims 5, 18, and 31 from which they depend.

**Claims 3-7, 10, 16-20, 23, 29-33, and 36
Are Patentable Over The Combination Of Joy, Elliott, and Tetsuo**

Claims 3-7, 10, 16-20, 23, 29-33, and 36 have been rejected under 35 U.S.C. Sec. 103(a) as being unpatentable over Joy in view of Elliott "Integrated Circuit Manufacturing Technology" (hereinafter "Elliott") or Tetsuo et al. Japanese Publication No. 11-329944 (hereinafter "Tetsuo"). The Applicants respectfully submit that all claims are patentable over the combination of Joy, Elliott, and Tetsuo for at least the reasons discussed below.

Claim 5, for example, recites a method for patterning a layer on a substrate with a desired image. The method of Claim 5 includes:

projecting coherent radiation toward a reflector surface so that the coherent radiation is reflected off the reflector surface to provide a holographic projection of the desired image wherein the reflector surface includes information that corresponds to an inverse of the holographic projection of the desired image;

projecting a portion of the coherent radiation to the layer without reflecting off the reflector surface; and

maintaining the substrate including the layer in the path of the reflected radiation and in the path of the portion of the coherent radiation projected without reflecting off the reflector surface so that the holographic projection of the desired image is projected onto the layer to thereby pattern the layer with the desired image;

wherein the step of projecting coherent radiation comprises projecting a coherent beam of electrons.

As discussed above, Joy discusses scanning electron microscope imaging as opposed to patterning as recited in Claim 5. Elliott and/or Tetsuo fail to provide the missing teachings. More particularly, Elliott discusses resists "formulated for use with e-beam exposure" (Elliott, page 77), and Tetsuo discusses a structure in Figure 3 including Si substrate 31, Si oxide film 32, polysilane 33, and chemistry amplification type positive resist 34, (Tetsou, translation, page 3, paragraph 25) "to form a highly precise resist pattern, without a charge up arising (Tetsou, translation, page 3, paragraph 30).

Nothing in any of these references teaches or suggests patterning as recited in Claim 5 where radiation is reflected off a reflector surface to provide a holographic projection of a desired image wherein the reflector surface includes information corresponding to an inverse of the holographic projection of the desired image and wherein the holographic projection of the desired image is projected onto a layer to thereby pattern the layer with the desired image. In contrast, Joy discusses scanning electron microscopy and Elliott and Tetsou discuss electron beam resists without mention of holographic projection.

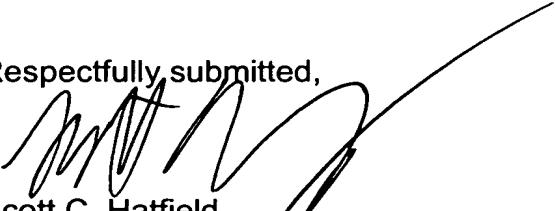
For at least these reasons, the Applicants respectfully submit that Claim 5 is patentable over the combination of Joy, Elliott, and/or Tetsou. The Applicants further submit that Independent Claims 3-5, 10, 16-18, 23, 29-31, and 36 are patentable over the combination of Joy, Elliott, and/or Tetsou for reasons similar to those discussed above with regard to Claim 5. In addition, Dependent Claims 6-7, 19-20, and 32-33 are patentable over the combination of Joy, Elliott, and/or Tetsou at least as per the patentability of Claims 5, 18, and 31 from which they depend.

Independent Claims 3-4, 16-17, and 29-30 are also independently patentable. Claim 3, for example, recites that the layer being patterned comprises an oxide layer that is activated on exposure to portions of the holographic projection of the desired image having sufficient intensity so that activated portions of the oxide layer can be selectively removed, maintained, or modified. Claim 4, for example, recites that the layer comprises a silicon layer this is activated on exposure to portions of the holographic projection of the desired image having sufficient intensity so that activated portions of the silicon layer can be selectively oxidized or modified.

As discussed above, Joy relates to microscope imaging as opposed to patterning, and both Elliott and Tetsou discuss patterning of electron beam resists. None of the cited references, however, discloses or suggests oxide or silicon layers that are activated on exposure to portions of a holographic projection. Accordingly, the combination of Joy, Elliott, and Tetsou fails to disclose or suggest the recitations of Claims 3 and 4, and Claims 3 and 4 are thus independently patentable. In addition, Claims 16, 17, 29, and 30 are also independently patentable for reasons similar to those discussed above with regard to Claims 3 and 4.

CONCLUSION

The Applicants sincerely appreciate the Examiner's thorough examination of this application. In response, the Applicants submit that all rejections have been overcome and that all pending claims in the present application are in condition for allowance for at least the reasons discussed above. A Notice of Allowance is thus respectfully requested in due course. The Examiner is encouraged to contact the undersigned attorney by telephone should any additional issues need to be addressed.

Respectfully submitted,

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In re: Daniel J.C. Herr et al.
Serial No.: 09/781,881
Filed: February 12, 2001
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I hereby certify that this correspondence is being deposited with the United States Postal Service as first class mail in an envelope addressed to: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450, on May 29, 2003.

Candi L. Riggs
Candi L. Riggs
Date of Signature: May 29, 2003

Version With Markings To Show Changes Made

In the Claims:

Please enter the cancellation of Claim 1.

Please enter the amendment of Claim 2 as indicated below.

2.(Amended) A method according to Claim ~~1~~¹⁻⁵ further comprising the step of:

developing the layer so that portions thereof are maintained and removed according to the intensity of the holographic projection of the desired image thereon.

Please enter the amendment of Claim 3 as indicated below.

3.(Amended) ~~{A method according to Claim 1}~~ A method for patterning a layer on a substrate with a desired image, the method comprising the steps of:

projecting coherent radiation toward a reflector surface so that the coherent radiation is reflected off the reflector surface to provide a holographic projection of the desired image wherein the reflector surface includes information that corresponds to an inverse of the holographic projection of the desired image;

projecting a portion of the coherent radiation to the layer without reflecting off the reflector surface;

and

maintaining the substrate including the layer in the path of the reflected radiation and in the path of the portion of the coherent radiation projected without reflecting off the reflector surface so that the holographic projection of the desired image is projected onto the layer to thereby pattern the layer with the desired image;

wherein the layer comprises an oxide layer that is activated on exposure to portions of the holographic projection of the desired image having sufficient intensity, so that activated portions of the oxide layer can be selectively removed, maintained, or modified.

Please enter the amendment of Claim 4 as indicated below.

4.(Amended) ~~[A method according to Claim 1]~~ A method for patterning a layer on a substrate with a desired image, the method comprising the steps of:
projecting coherent radiation toward a reflector surface so that the coherent radiation is reflected off the reflector surface to provide a holographic projection of the desired image wherein the reflector surface includes information that corresponds to an inverse of the holographic projection of the desired image;
projecting a portion of the coherent radiation to the layer without reflecting off the reflector surface;
and
maintaining the substrate including the layer in the path of the of the reflected radiation and in the path of the portion of the coherent radiation projected without reflecting off the reflector surface so that the holographic projection of the desired image is projected onto the layer to thereby pattern the layer with the desired image;
wherein the layer comprises a silicon layer that is activated on exposure to portions of the holographic projection of the desired image having sufficient intensity, so that activated portions of the silicon layer can be selectively oxidized or modified.

Please enter the amendment of Claim 5 as indicated below.

5.(Amended) ~~[A method according to Claim 1]~~ A method for patterning a layer on a substrate with a desired image, the method comprising the steps of:
projecting coherent radiation toward a reflector surface so that the coherent radiation is reflected off the reflector surface to provide a holographic projection of the desired image wherein the reflector surface includes information that corresponds to an inverse of the holographic projection of the desired image;
projecting a portion of the coherent radiation to the layer without reflecting off the reflector surface; and
maintaining the substrate including the layer in the path of the of the reflected radiation and in the path of the portion of the coherent radiation projected without reflecting off the reflector surface so that the holographic projection of the desired

image is projected onto the layer to thereby pattern the layer with the desired image;
wherein the step of projecting coherent radiation comprises projecting a coherent beam of electrons.

Please enter the amendment of Claim 8 as indicated below.

8.(Amended) A method according to Claim [1] 11 wherein the step of projecting coherent radiation comprises projecting laser radiation.

Please enter the amendment of Claim 9 as indicated below.

9.(Amended) A method according to Claim [1] 5 wherein the holographic projection of the desired image comprises a Fresnel hologram.

Please enter the amendment of Claim 10 as indicated below.

10.(Amended) ~~{A method according to Claim 1}~~ A method for patterning a layer on a substrate with a desired image, the method comprising the steps of:
projecting coherent radiation toward a reflector surface so that the coherent radiation is reflected off the reflector surface to provide a holographic projection of the desired image wherein the reflector surface includes information that corresponds to an inverse of the holographic projection of the desired image;
projecting a portion of the coherent radiation to the layer without reflecting off the reflector surface; and
maintaining the substrate including the layer in the path of the reflected radiation and in the path of the portion of the coherent radiation projected without reflecting off the reflector surface so that the holographic projection of the desired image is projected onto the layer to thereby pattern the layer with the desired image;

wherein the step of projecting the coherent radiation comprises projecting the coherent radiation along divergent paths.

Please enter the amendment of Claim 11 as indicated below.

11.(Amended) ~~{A method according to Claim 1 further comprising:}~~ A

method for patterning a layer on a substrate with a desired image, the method comprising the steps of:

projecting coherent radiation toward a reflector surface so that the coherent radiation is reflected off the reflector surface to provide a holographic projection of the desired image wherein the reflector surface includes information that corresponds to an inverse of the holographic projection of the desired image;

projecting a portion of the coherent radiation to the layer without reflecting off the reflector surface;

maintaining the substrate including the layer in the path of the reflected radiation and in the path of the portion of the coherent radiation projected without reflecting off the reflector surface so that the holographic projection of the desired image is projected onto the layer to thereby pattern the layer with the desired image; and

filtering the coherent radiation reflected off the reflector surface to reduce transmission of portions of the interference pattern corresponding to defects on the reflector surface.

Please enter the amendment of Claim 12 as indicated below.

12.(Amended) A method according to Claim 1 further comprising: A method for patterning a layer on a substrate with a desired image, the method comprising the steps of:

projecting coherent radiation toward a reflector surface so that the coherent radiation is reflected off the reflector surface to provide a holographic projection of the desired image wherein the reflector surface includes information that corresponds to an inverse of the holographic projection of the desired image;

projecting a portion of the coherent radiation to the layer without reflecting off the reflector surface;

maintaining the substrate including the layer in the path of the reflected radiation and in the path of the portion of the coherent radiation projected without reflecting off the reflector surface so that the holographic projection of the desired image is projected onto the layer to thereby pattern the layer with the desired image;
and

projecting coherent radiation toward a second reflector surface so that the coherent radiation is reflected off the second reflector surface to provide a second holographic projection of reflected radiation;

wherein maintaining the substrate further comprises maintaining the substrate including the layer in the path of the radiation reflected off the second reflector surface so that the second holographic projection is projected onto the layer.

Please enter the cancellation of Claims 14 and 15.

Please enter the amendment of Claim 16 as indicated below.

16.(Amended) ~~[A system according to Claim 15]~~ A system for patterning a layer on a substrate with a desired image, the system comprising:

means for projecting coherent radiation toward a reflector surface so that the coherent radiation is reflected off the reflector surface to provide a holographic projection of the desired image wherein the reflector surface includes information that corresponds to an inverse of the holographic projection of the desired image;

means for projecting a portion of the coherent radiation to the substrate including the layer without reflecting off the reflector surface; and

means for maintaining the substrate including the layer in the path of the reflected radiation and in the path of the portion of the coherent radiation projected without reflecting off the reflector surface so that the holographic projection of the desired image is projected onto the layer to thereby pattern the layer with the desired image;

wherein the layer comprises an oxide layer that is activated on exposure to portions of the holographic projection of the desired image having sufficient intensity, so that activated portions of the oxide layer can be selectively removed, maintained, or modified.

Please enter the amendment of Claim 17 as indicated below.

17.(Amended) ~~[A system according to Claim 15]~~ A system for patterning a layer on a substrate with a desired image, the system comprising:

means for projecting coherent radiation toward a reflector surface so that the coherent radiation is reflected off the reflector surface to provide a holographic projection of the desired image wherein the reflector surface includes information that corresponds to an inverse of the holographic projection of the desired image;

means for projecting a portion of the coherent radiation to the substrate including the layer without reflecting off the reflector surface; and

means for maintaining the substrate including the layer in the path of the of the reflected radiation and in the path of the portion of the coherent radiation projected without reflecting off the reflector surface so that the holographic projection of the desired image is projected onto the layer to thereby pattern the layer with the desired image;

wherein the layer comprises a silicon layer that is activated on exposure to portions of the holographic projection of the desired image having sufficient intensity, so that activated portions of the silicon layer can be selectively oxidized or modified.

Please enter the amendment of Claim 18 as indicated below.

18.(Amended) ~~[A system according to Claim 15]~~ A system for patterning a layer on a substrate with a desired image, the system comprising:

means for projecting coherent radiation toward a reflector surface so that the coherent radiation is reflected off the reflector surface to provide a holographic projection of the desired image wherein the reflector surface includes information that corresponds to an inverse of the holographic projection of the desired image;

means for projecting a portion of the coherent radiation to the substrate including the layer without reflecting off the reflector surface; and
means for maintaining the substrate including the layer in the path of the of the reflected radiation and in the path of the portion of the coherent radiation projected without reflecting off the reflector surface so that the holographic projection of the desired image is projected onto the layer to thereby pattern the layer with the desired image;

wherein the means for projecting coherent radiation comprises means for projecting a coherent beam of electrons.

Please enter the amendment of Claim 21 as indicated below.

21.(Amended) A system according to Claim 15 24 wherein the means for projecting coherent radiation comprises means for projecting laser radiation

Please enter the amendment of Claim 22 as indicated below.

22.(Amended) A system according to Claim 15 18 wherein the holographic projection of the desired image comprises a Fresnel hologram.

Please enter the amendment of Claim 23 as indicated below.

23.(Amended) ~~A system according to Claim 15~~ A system for patterning a layer on a substrate with a desired image, the system comprising:

means for projecting coherent radiation toward a reflector surface so that the coherent radiation is reflected off the reflector surface to provide a holographic projection of the desired image wherein the reflector surface includes information that corresponds to an inverse of the holographic projection of the desired image;

means for projecting a portion of the coherent radiation to the substrate including the layer without reflecting off the reflector surface; and

means for maintaining the substrate including the layer in the path of the of the reflected radiation and in the path of the portion of the coherent radiation projected without reflecting off the reflector surface so that the holographic projection

of the desired image is projected onto the layer to thereby pattern the layer with the desired image;

wherein the means for projecting the coherent radiation comprises means for projecting the coherent radiation along divergent paths.

Please enter the amendment of Claim 24 as indicated below.

24.(Amended) ~~{A system according to Claim 15 further comprising:}~~ A system for patterning a layer on a substrate with a desired image, the system comprising:

means for projecting coherent radiation toward a reflector surface so that the coherent radiation is reflected off the reflector surface to provide a holographic projection of the desired image wherein the reflector surface includes information that corresponds to an inverse of the holographic projection of the desired image;

means for projecting a portion of the coherent radiation to the substrate including the layer without reflecting off the reflector surface;

means for maintaining the substrate including the layer in the path of the of the reflected radiation and in the path of the portion of the coherent radiation projected without reflecting off the reflector surface so that the holographic projection of the desired image is projected onto the layer to thereby pattern the layer with the desired image; and

means for filtering the coherent radiation reflected off the reflector surface to reduce transmission of portions of the interference pattern corresponding to defects on the reflector surface.

Please enter the amendment of Claim 25 as indicated below.

25.(Amended) A system according to Claim ~~{15}~~ 18 wherein the means for projecting coherent radiation comprises means for projecting two beams of coherent radiation toward the reflector surface.

Please enter the amendment of Claim 26 as indicated below.

26.(Amended) ~~[A system according to Claim 15 further comprising:]~~
A system for patterning a layer on a substrate with a desired image, the system comprising:

means for projecting coherent radiation toward a reflector surface so that the coherent radiation is reflected off the reflector surface to provide a holographic projection of the desired image wherein the reflector surface includes information that corresponds to an inverse of the holographic projection of the desired image;

means for projecting a portion of the coherent radiation to the substrate including the layer without reflecting off the reflector surface;

means for maintaining the substrate including the layer in the path of the of the reflected radiation and in the path of the portion of the coherent radiation projected without reflecting off the reflector surface so that the holographic projection of the desired image is projected onto the layer to thereby pattern the layer with the desired image;

means for projecting coherent radiation toward a second reflector surface so that the coherent radiation is reflected off the second reflector surface to provide a second holographic projection of reflected radiation; and

means for maintaining the substrate including the layer in the path of the radiation reflected off the second reflector surface so that the second holographic projection is projected onto the layer.

Please enter the cancellation of Claims 27 and 28.

Please enter the amendment of Claim 29 as indicated below.

29.(Amended) ~~[A system according to Claim 28]~~ A system for patterning a layer on a substrate surface with a desired image, the system comprising:

a radiation source that is configured to project coherent radiation toward a reflector surface so that the coherent radiation is reflected off the reflector surface and so that a portion of the coherent radiation is projected to the layer without reflecting off the reflector surface to project a holographic projection of the desired

image on the layer so that the holographic image of the desired image is used to pattern the layer with the desired image;

wherein the layer comprises an oxide layer that is activated on exposure to portions of the holographic projection of the desired image having sufficient intensity, so that activated portions of the oxide layer can be removed, maintained, or modified.

Please enter the amendment of Claim 30 as indicated below.

30.(Amended) ~~[A system according to Claim 28]~~ A system for patterning a layer on a substrate surface with a desired image, the system comprising:

a radiation source that is configured to project coherent radiation toward a reflector surface so that the coherent radiation is reflected off the reflector surface and so that a portion of the coherent radiation is projected to the layer without reflecting off the reflector surface to project a holographic projection of the desired image on the layer so that the holographic image of the desired image is used to pattern the layer with the desired image;

wherein the layer comprises a silicon layer that is activated on exposure to portions of the holographic projection of the desired image having sufficient intensity, so that activated portions of the silicon layer can be selectively oxidized or modified.

Please enter the amendment of Claim 31 as indicated below.

31.(Amended) ~~[A system according to Claim 28]~~ A system for patterning a layer on a substrate surface with a desired image, the system comprising:

a radiation source that is configured to project coherent radiation toward a reflector surface so that the coherent radiation is reflected off the reflector surface and so that a portion of the coherent radiation is projected to the layer without reflecting off the reflector surface to project a holographic projection of the desired image on the layer so that the holographic image of the desired image is used to pattern the layer with the desired image;

wherein the coherent radiation comprises a coherent beam of electrons.

Please enter the amendment of Claim 34 as indicated below.

34.(Amended) A system according to Claim [28] 37 wherein the coherent radiation comprises laser radiation.

Please enter the amendment of Claim 35 as indicated below.

35.(Amended) A system according to Claim [28] 31 wherein the holographic projection of the desired image comprises a Fresnel hologram.

Please enter the amendment of Claim 36 as indicated below.

36.(Amended) [A system according to Claim 28] A system for patterning a layer on a substrate surface with a desired image, the system comprising:
a radiation source that is configured to project coherent radiation toward a reflector surface so that the coherent radiation is reflected off the reflector surface and so that a portion of the coherent radiation is projected to the layer without reflecting off the reflector surface to project a holographic projection of the desired image on the layer so that the holographic image of the desired image is used to pattern the layer with the desired image;

wherein the radiation source projects the coherent radiation along divergent paths.

Please enter the amendment of Claim 37 as indicated below.

37.(Amended) [A system according to Claim 28 further comprising:] A system for patterning a layer on a substrate surface with a desired image, the system comprising:
a radiation source that is configured to project coherent radiation toward a reflector surface so that the coherent radiation is reflected off the reflector surface and so that a portion of the coherent radiation is projected to the layer without reflecting off the reflector surface to project a holographic projection of the desired image on the layer so that the holographic image of the desired image is used to

pattern the layer with the desired image; and

a filter that is configured to filter the coherent radiation reflected off the reflector surface to reduce transmission of portions of the interference pattern corresponding to defects on the reflector surface.

Please enter the amendment of Claim 38 as indicated below.

38.(Amended) A system according to Claim [28] 31 wherein the radiation source comprises two radiation sources that are each configured to project a respective beam of coherent radiation toward the reflector surface.

Please enter the amendment of Claim 39 as indicated below.

39.(Amended) ~~[A system according to Claim 28]~~ A system for patterning a layer on a substrate surface with a desired image, the system comprising:
a radiation source that is configured to project coherent radiation toward a reflector surface so that the coherent radiation is reflected off the reflector surface and so that a portion of the coherent radiation is projected to the layer without reflecting off the reflector surface to project a holographic projection of the desired image on the layer so that the holographic image of the desired image is used to pattern the layer with the desired image;

wherein the radiation source is further configured to project coherent radiation toward a second reflector surface so that the coherent radiation is reflected off the second reflector surface to project a second holographic projection of reflected radiation on the layer.

Please enter the cancellation of Claim 40.